FLOOD MONITORING SYSTEM WITH SMS NOTIFICATION

Mr. Sudharshan Banakar[1], Ms. Sree Vani K[2], Ms. Shruthi K Y[3], Ms. G. Rajini[4]

Assistant Professor[1], UG Scholars[2],[3],[4]

Department of Electronics and communication Engineering, RYMEC, Ballari

ABSTRACT - The main problem in India with respect to floods is inundation, drainage congestion due to urbanization and bank erosion. The problem depends on the river system, topography of the place and flow phenomenon. Flooding occurs when an extreme volume of water is carried by rivers, creeks and many other geographical features into areas where the water cannot be drained adequately.Floods cause extremely large numbers of fatalities in every country, but due to India's extremely high population density and often under-enforced development standards, a large amount of damages and many deaths which could be otherwise avoided. India witnesses flood due to excessive rain which then results in overflow of rivers, lakes and dams, which adds to cause large amounts of damage to people's lives and property. Hence this novel approach is used to monitor and alert floods using Arduino in affecting prone areas.

Keywords - Arduino Uno; GSM modem; SMS notification; Solar Panel; Battery; ULN2003 IC.

I. INTRODUCTION

In June 2013 North Indian floods: Heavy rain due to cloudburst caused severe floods and landslides on the North Indian states, mainly Uttarakhand and nearby states. More than 5,700 people were presumed dead. August 2018 Kerala Flood Following high rain in late July 2018 and heavy Monsoon rainfall from August 8, 2018, severe flooding affected the Indian state of Kerala resulting over 445 deaths.

In the past, India has witnessed many of the largest, most catastrophic floods, causing irreparable damage to people's livelihood, property, and crucial infrastructure. There are different types of floods that occur yearly such as river floods, flash floods and coastal floods.

A. River flood

A river flood is initiated by heavy rains due to monsoons, hurricanes, tropical storms or snow melts which increases the capacity of the rivers and its tributaries. The possibility of flood can also be the blockage of the water body's natural flow due to mud from landslides and other natural outgrowth. River floods can also occur because of excess clearance of vegetation by human beings in river banks.

B. Flash flood

Flash flood refers to a phenomenon where water level raises rapidly within a short period of time. It is caused by sudden incident of heavy rainfall. Flash flood is a major problem in many countries. There is no proper remedy for this kind of flood as it arises suddenly.

C. Coastal flood

The act of sea water penetration into the domestic area is coastal floods. This may occur due to a situation of low pressure with high tides or storms. In both the cases sea level rises abnormally which causes flooding.

The major **flood** prone **regions in India** are Punjab, Haryana, most of the Gangetic plains including Uttar Pradesh, North Bihar and West Bengal, the Brahmaputra valley, coastal Andhra Pradesh and Orissa, and southern Gujarat. This supports the need for early warning and monitoring system of flood water level. The design project is to create a flood water level monitoring system that has an early warning device and can send notifications through SMS using Arduino Uno with solar panel and generator as its power source.

II. PROBLEM IDENTIFICATION

The Main problems in INDIA with respect to floods are inundation, drainage congestion due to urbanization and bank erosion. The problems depend on the river system, topography of the place and flow phenomenon. The catchments of these rivers receive large amount of rainfall.

III. LITERATURE SURVEY

The releated work in the area of Flood Monitoring System explains as follows "Video Surveillance System For Real Time Flood Detection And

Mobile App For Flood Alert" – Usually brides are connected across seas, rivers and other waterways these are more prone to disaster such as flooding and tsunamis in order to alert the people caused by these disasters, an early detection and warning system is designed. The flood range is detected using video streaming process and warning information is provided if its exceeds a certain threshold the flood information is transfer to local public using mobile app named "FLOOD ALERT", developed using Android and Java. It gives information about location of flood occurred region and also corresponding date and time. This system is capable of reducing negative impacts, mainly caused due to collapse of bridge due to flood [1].

"Real Time Flood Water Level Monitoring System With SMS Notification"- Metropolitan Manila, Philippines is one of the regions at high risk from flooding. The purpose of this project is to provide a standalone flood water level monitoring system for the community in Kahilom street Manila. The system is constructed through use of Arduino Uno, GSM shield and sensors that will be powered by a solar panel with generator. The early warning device will be the three LED that is mounted to PVC pipe and then the system will send an SMS notification to the people in the community. The result that objective of design satisfied the needs of client [2].

"A Novel Approach For Early Flood Warning Using Android And IOT"- Flood is a phenomenon by which living and non-living entities that belong to the environment suffer various losses. Human beings cannot avoid floods but only thing human can do is, they can develop systems to predict and subsequent measures to alert people about its occurance. There are many technologies available to predict and prevent. There are many disasters that leads to floods. Some of them are heavy rains and tropical cyclones. These floods cause materialistic and human damage. The main reason behind development of flood alert system is the intimation of flood well in advance so that human losses can be controlled by evacuation of people to safe places and also protects valuable properties [3].

"Smart Flood Disaster Prediction System Using IOT And Neural Networks"- Floods are natural disaster that cause catastrophic destruction and devastation of natural life, agriculture, property and infrastructure every year.

Flooding is influenced by various hydrological and meteorological factors.IOT is a technology that is a combination of embedded system hardware and wireless communication network which further transfers sensed data to computing device for analysis in real-time researchers in direction of flood prediction have shifted from hydrological models to algorithm based approaches. To predict floods techniques such as Artificial Neural Network are used to device prediction.

The main objective of this paper is to monitor humidity, temperature, pressure, rainfall, river water level and to find their temporal correlative information for flood prediction analysis and protection [4].

"Flood Transmission Based Protocol For Home Automation System Via Power Line Communication"- There are many researchers and development involving the use of power line as data transmission medium. With multiple power outlets in almost every room in every house, the power line is most pervasive network and largest infrastructure available. The aim of this project is to deploy this infrastructure in designing a Home Automation System. This paper presents a method to develop a Home Automation System using a AC power line to establish a network between main controlling unit and client units with a proprietary designed power line communication protocol. The designed protocol has features such as multimode simplex communication, flood transmission and even parity error detection. The protocol is successfully implemented and tested in a Home Automation System consisting of one main controlling unit, three client units and data using power line as transmission medium to corresponding device [5].

"Development of Flood Detector System Using MC68HC11 Microcontroller"- This project is involving the development of Flood Detector system which will determine the current water level that is assuming from the voltage from the detector. The data that has been collected will be analyzed in data base to make sure the safety purpose been taken if the water reach to warning level. The overall flood detector system design consists of hardware and software development. The most important hardware design is a microcontroller board that used to control the whole system and the transmitter and receiver module that used to send and collect the data[6].

IV. DESIGN METHODOLOGY

The Block Diagram of Arduino UNO Based Flood Detection is as shown in Figure No. 1. The system is constructed through the use of Arduino Uno, GSM modem and ULN2003 IC that will be powered by a ULN2003 IC with Battery. The early warning device will be the three LED that is mounted to a PVC pipe and then the system will send an SMS notification to the people in the community. The functionality of the system was tested by the simulation of flooding. The results provided that the objectives of the design satisfied the needs of the client.

The system will be using a solar panel with Battery for the power source of the system. Firstly, the ULN2003 IC will be giving the input signals needed to the Arduino. Secondly, Arduino will analyze the signal and it will be the basis of the current flood water level. Thirdly, one of the three LED will turn on depending from the readings. Lastly, the GSM shield will automatically send the flood water level to the registered mobile number using SMS in Real time. Lastly, the GSM shield will automatically send the flood water level to the registered mobile number using SMS in Real time.
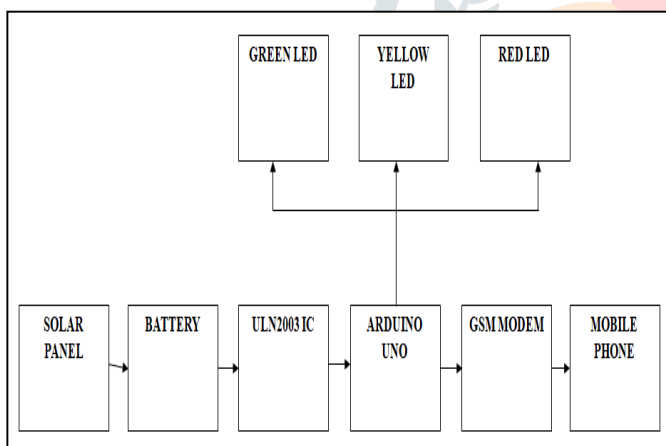

Figure No.1 : Block Diagram System

V. EXPERIMENTAL RESULTS

The Experimental setup is done as shown in Figure No. 2 and the results are concluded as per the Table No. 1.

Figure No.2 : Experimental Setup

Table No.1 : Water level indicators.

Water Level	Indicator	Conclusion
Very High	Green	Dangerous situation
Medium	Yellow	Critical Situation
Low	Red	Normal Situation

VI. ADVANTAGES

The following are the advantages associated with Flood Monitoring System

1. Everyone is alerted for flood occurrence and can react quicker.
2. People are able to retrieve their belongings needed before any disaster occurs.
3. People are able to evacuate their homes before any destruction occurs.
4. Inexpensive.
5. Doesn't affect the environment around it.

VII. DISADVANTAGES

The following are the identified disadvantages associated with Flood Monitoring System

1. Network availability could go wrong and the SMS is not sent.
2. The flood water can be dangerous when they have more depth and speed.

VIII. APPLICATIONS

Bangladesh is the most flood prone area in the world. The major flood prone regions in India are Punjab, Haryana, most of the Gangetic plains including Uttar Pradesh, North Bihar and West Bengal, the Brahmaputra valley, coastal Andhra Pradesh and Orissa, and southern Gujarat, recently occured flood in karnataka that is Kodugu, hence the flood alert methods are used to reduce or prevent the detrimental effects of flood waters or high water levels.

IX. CONCLUSION

This project discusses a design for creation of a real-time flood water level monitoring system with SMS notification for the residence near flood occuring region through the use of Arduino Uno. This project discusses the steps needed in order to make the said design. There are two types of tests to examine the created design. The first

test is testing the average time it takes for the system to sense the flood water level and how fast the will it send the SMS. The second test is verify if the system can notify people from afar using the three LED as its early warning device, all the LEDs are visible whether in day time or in night time. There is just a slight visibility of the yellow LED in day time because of its colour is the same as the sunlight. According to the results, the early warning device is working as intended. With these, the main objective of building an early warning device that will notify people of flood region about the flood water level in their vicinity is successfully achieved.

REFERENCES

[1]. **Priya Menon K,** "Video Surveillance System For Real Time Flood Detection and Mobile App For Flood Alert", DOI:978-1-5090-4890-8/17/2017, IEEE.

[2]. **Esteves,** "Real Time Flood Water Level Monitoring System with SMS Notification". DOI:178-1-5386-0912-5/17/2017 IEEE

[3]. **Jayashree S**, "A Novel Approach For Early Flood Warning Using Android and IOT". DOI:978-1-5090-6221-8/17/2017 IEEE.

[4]. **Swapnil Bande**, "Smart Flood Disaster Prediction System Using IOT and Neural Networks". DOI:978-1-5386-0569-1/2017 IEEE.

[5]. **Tan Zun Yang**, "Flood Transmission Based Protocol For Home automation System via Power LineCommunication".DOI:978-4244-1692 9/08/2008 IEEE.

[6]. **Zainah Md. Zain**, "Development of Flood Detector System Using MC68HC11 Microcontroller".DOI:1-4244-1470-9/07/2007 IEEE.4244-1470-9/07/2007 IEEE.